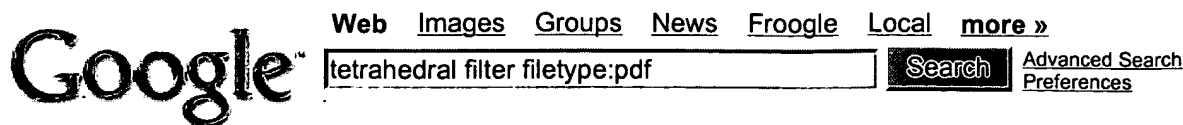


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L1	2	"6430590".pn.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/09/26 17:06
L2	24	filter near6 tetrahedral\$7	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/09/26 17:43
L3	0	703/2.ccls. and tetrahedral\$7 and directory same freedom	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/09/26 17:40
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L6	40	703/2.ccls. and tetrahedral\$7	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/09/26 17:16
L7	0	L6 and \$4conformal near3 mesh	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/09/26 17:14
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L21	0	716/?ccls. and tetrahedral\$7 same directory	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/09/26 17:42

L22	0	directory near6 tetrahedral\$7	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/09/26 17:43
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this technique also developed the curved solenoidal **filter**, which provides a ... only 8.99 atoms instead of 12 as expected for a random **tetrahedral** network. ...

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inventor G. Evensen, is one of the most used **filter** algorithms for ... FEOM uses **tetrahedral** spatial discretization, backward Euler ...

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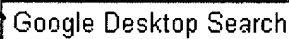
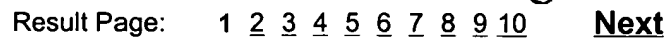
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**1** [Analytic antialiasing with prism splines](#)

Michael D. McCool

September 1995 **Proceedings of the 22nd annual conference on Computer graphics and interactive techniques**Full text available: pdf(300.28 KB)  
 ps(2.23 MB)Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)**2** [Dissertation Abstracts in Computer Graphics](#)

Jeffrey J. McConnell

April 1988 **ACM SIGGRAPH Computer Graphics**, Volume 22 Issue 2

Full text available: pdf(1.65 MB)

Additional Information: [full citation](#), [abstract](#)

This paper is the first of a yearly compendium of abstracts from masters and doctoral theses in computer graphics. The compendium is being provided as a guide to the work being done in computer graphics by graduate students. Any requests for further information about a thesis or graduate student should be directed to the institution involved. This year's compendium has 54 entries from 23 institutions. The list is by no means complete as there are several prominent graduate schools missing. It is ...

**3** [Poster session: Adaptive and quality 3D meshing from imaging data](#)

Yongjie Zhang, Chandrajit Bajaj, Bong-Soo Sohn

June 2003 **Proceedings of the eighth ACM symposium on Solid modeling and applications**

Full text available: pdf(558.09 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

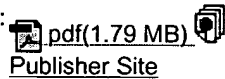
This paper presents an algorithm to extract adaptive and quality 3D meshes directly from volumetric imaging data - primarily Computed Tomography (CT) and Magnetic Resonance Imaging (MRI). The extracted tetrahedral and hexahedral meshes are extensively used in finite element simulations. Our comprehensive approach combines bilateral and anisotropic (feature specific) diffusion filtering, with contour spectrum based, isosurface and interval volume selection. Next, a top-down octree subdivision cou ...

**Keywords:** 3D meshes, adaptive, feature sensitive, hanging nodes, quality**4** [Session P3: filtering and sampling: Simplicial subdivisions and sampling artifacts](#)

Hamish Carr, Torsten Möller, Jack Snoeyink

October 2001 **Proceedings of the conference on Visualization '01**

Full text available:



Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

We review several schemes for dividing cubical cells into simplices (tetrahedra) in 3-D for interpolating from sampled data to  $\mathbb{R}^3$  or for computing isosurfaces by barycentric interpolation. We present test data that reveal the geometric artifacts that these subdivision schemes generate, and discuss how these artifacts relate to the filter kernels that correspond to the subdivision schemes.

##### 5 Multi-resolution representations: Interactive visualization of unstructured grids using hierarchical 3D textures

Joshua Leven, Jason Corso, Jonathan Cohen, Subodh Kumar

October 2002 **Proceedings of the 2002 IEEE symposium on Volume visualization and graphics**

Full text available: pdf(2.83 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

We present a system for interactively rendering large, unstructured grids. Our approach is to voxelize the grid into a 3D voxel octree, and then to render the data using hierarchical, 3D texture mapping. This approach leverages the current 3D texture mapping PC hardware for the problem of unstructured grid rendering. We specialize the 3D texture octree to the task of rendering unstructured grids through a novel *pad and stencil* algorithm, which distinguishes between data and non-data voxel ...

##### 6 Data reduction and interpolation for visualizing 3D soil-quality data

David C. Banks, Bernd Hamann, Po-Yu Tsai, Robert Moorhead, Jonathan Barlow

October 1996 **Proceedings of the 7th conference on Visualization '96**

Full text available: pdf(366.61 KB)

Additional Information: [full citation](#), [references](#), [index terms](#)



##### 7 IEEE Visualization Cumulative Bibliography (1990 - 2004)

October 2004 **Proceedings of the conference on Visualization '04**

Full text available: pdf(811.24 KB)

Additional Information: [full citation](#)

##### 8 Nice point sets can have nasty Delaunay triangulations

Jeff Erickson

June 2001 **Proceedings of the seventeenth annual symposium on Computational geometry**

Full text available: pdf(439.12 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

We consider the complexity of Delaunay triangulations of sets of point  $s$  in  $\mathbb{R}^3$  under certain practical geometric constraints. The *spread* of a set of points is the ratio between the longest and shortest pairwise distances. We show that in the worst case, the Delaunay triangulation of  $n$  points in  $\mathbb{R}^3$  with spread  $\Delta$  has complexity  $\Omega(\min\{\Delta^3, n\Delta, n^2\})$  and  $O(\min\{\Delta^4, n^2\})$ . For the case  $\Delta = \Theta(\sqrt{n})$ , our lower bound ...

**Keywords:** Delaunay triangulation, lower bounds, sample, sample measure, spread, surface reconstruction

9 Interactive skeleton-driven dynamic deformations

Steve Capell, Seth Green, Brian Curless, Tom Duchamp, Zoran Popović

July 2002 **ACM Transactions on Graphics (TOG) , Proceedings of the 29th annual conference on Computer graphics and interactive techniques**, Volume 21 Issue 3

Full text available:  [pdf\(7.38 MB\)](#)

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This paper presents a framework for the skeleton-driven animation of elastically deformable characters. A character is embedded in a coarse volumetric control lattice, which provides the structure needed to apply the finite element method. To incorporate skeletal controls, we introduce line constraints along the bones of simple skeletons. The bones are made to coincide with edges of the control lattice, which enables us to apply the constraints efficiently using algebraic methods. To accelerate ...

**Keywords:** animation, deformation, physically-based animation, physically-based modeling

10 Tetrahedron based, least squares, progressive volume models with application to freehand ultrasound data

Tom Roxborough, Gregory M. Nielson

October 2000 **Proceedings of the conference on Visualization '00**

Full text available:  [pdf\(1.80 MB\)](#)

Additional Information: [full citation](#), [citations](#), [index terms](#)

11 Area and volume coherence for efficient visualization of 3D scalar functions

Nelson Max, Pat Hanrahan, Roger Crawfis

November 1990 **ACM SIGGRAPH Computer Graphics , Proceedings of the 1990 workshop on Volume visualization**, Volume 24 Issue 5

Full text available:  [pdf\(759.25 KB\)](#)

Additional Information: [full citation](#), [abstract](#), [citations](#), [index terms](#)

We present an algorithm for compositing a combination of density clouds and contour surfaces used to represent a scalar function on a 3-D volume subdivided into convex polyhedra. The scalar function is interpolated between values defined at the vertices, and the polyhedra are sorted in depth before compositing. For  $n$  tetrahedra comprising a Delaunay triangulation, this sorting can always be done in  $O(n)$  time. Since a Delaunay triangulation can be efficiently computed for scattered ...

12 Visualization of Volume Data with Quadratic Super Splines

Christian Rossli, Frank Zeilfelder, Gunther Nurnberger, Hans-Peter Seidel

October 2003 **Proceedings of the 14th IEEE Visualization 2003 (VIS'03) VIS '03**

Full text available:  [pdf\(849.48 KB\)](#)

Additional Information: [full citation](#), [abstract](#)

We develop a new approach to reconstruct non-discrete models from gridded volume samples. As a model, we use quadratic trivariate super splines on a uniform tetrahedral partition  $\mathcal{T}$ . The approximating splines are determined in a natural and completely symmetric way by averaging local data samples, such that appropriate smoothness conditions are automatically satisfied. On each tetrahedron of  $\mathcal{T}$ , the quasi-interpolating spline is a polynomial of total degree two which provides several advantages i ...

**Keywords:** volume rendering, reconstruction, quadratic super splines, tetrahedral partition, Bernstein-Bézier techniques, isosurface rendering, ray-casting



**13 Surface: Isosurface generation by using extrema graphs**

Takayuki ITOH, Koji KOYAMADA

October 1994 **Proceedings of the conference on Visualization '94**Full text available:  pdf(482.96 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)

A high-performance algorithm for generating isosurfaces is presented. In this algorithm, extrema points in a scalar field are first extracted. A graph is then generated in which the extrema points are taken as nodes. Each arc of the graph has a list of IDs of the cells that are intersected by the arc. A boundary cell list ordered according to cells' values is also generated. The graph and the list generated in this pre-process are used as a guide in searching for seed cells. Isosurfaces are gene ...

**14 Meshes II: Variational tetrahedral meshing**

Pierre Alliez, David Cohen-Steiner, Mariette Yvinec, Mathieu Desbrun



July 2005 **ACM Transactions on Graphics (TOG)**, Volume 24 Issue 3Full text available:  pdf(980.48 KB) Additional Information: [full citation](#), [abstract](#), [references](#)

In this paper, a novel Delaunay-based variational approach to isotropic tetrahedral meshing is presented. To achieve both robustness and efficiency, we minimize a simple mesh-dependent energy through global updates of both vertex positions *and* connectivity. As this energy is known to be the  $L^1$  distance between an isotropic quadratic function and its linear interpolation on the mesh, our minimization procedure generates well-shaped tetrahedra. Mesh design is controlled throu ...

**Keywords:** delaunay mesh, isotropic meshing, sizing field, slivers

**15 Session P7: unstructured grids and volume rendering: Circular incident edge lists: a data structure for rendering complex unstructured grids**

Bruno Lévy, Guillaume Caumon, Stéphane Conreux, Xavier Cavin

October 2001 **Proceedings of the conference on Visualization '01**Full text available:  pdf(2.30 MB)  Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)  
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We present the *Circular Incident Edge Lists* (CIEL), a new data structure and a high-performance algorithm for generating a series of iso-surfaces in a highly unstructured grid. Slicing-based volume rendering is also considered. The CIEL data structure represents all the combinatorial information of the grid, making it possible to optimize the classical *propagation from local minima* paradigm. The usual geometric structures are replaced by a more efficient combinatorial structure. An ...

**Keywords:** combinatorial topology, iso-surfaces, unstructured grids, volume rendering

**16 Poster Session: A new solid subdivision scheme based on box splines**

Yu-Sung Chang, Kevin T. McDonnell, Hong Qin

June 2002 **Proceedings of the seventh ACM symposium on Solid modeling and applications**Full text available:  pdf(1.03 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

During the past twenty years, much research has been undertaken to study surface representations based on B-splines and box splines. In contrast, volumetric splines have received much less attention as an effective and powerful solid modeling tool. In this paper, we propose a novel solid subdivision scheme based on tri-variate box splines over tetrahedral tessellations in 3D. A new data structure is devised to facilitate the straightforward implementation of our simple, yet powerful solid subdiv ...

**Keywords:** blends, sweeps, offsets & deformations, geometric and topological representations, multi resolution models, representation conversion, reverse engineering, user interaction techniques

17 Discrete multiscale vector field decomposition

Yiying Tong, Santiago Lombeyda, Anil N. Hirani, Mathieu Desbrun

July 2003 **ACM Transactions on Graphics (TOG)**, Volume 22 Issue 3

Full text available:  pdf(8.65 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)

While 2D and 3D vector fields are ubiquitous in computational sciences, their use in graphics is often limited to regular grids, where computations are easily handled through finite-difference methods. In this paper, we propose a set of simple and accurate tools for the analysis of 3D discrete vector fields on arbitrary tetrahedral grids. We introduce a variational, multiscale decomposition of vector fields into three intuitive components: a divergence-free part, a curl-free part, and a harmonic ...

**Keywords:** Hodge decomposition, animation, scale-space description, variational approaches, vector fields, visualization

18 Session C1: volume rendering: Immersive volume visualization of seismic simulations: a case study of techniques invented and lessons learned

Prashant Chopra, Joerg Meyer, Antonio Fernandez

October 2002 **Proceedings of the conference on Visualization '02**

Full text available:  pdf(15.20 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

This paper is a documentation of techniques invented, results obtained and lessons learned while creating visualization algorithms to render outputs of large-scale seismic simulations. The objective is the development of techniques for a collaborative simulation and visualization shared between structural engineers, seismologists, and computer scientists. The computer graphics research community has been witnessing a large number of exemplary publications addressing the challenges faced while tr ...

**Keywords:** level-of-detail, mesh simplification, multi resolution, unstructured meshes

19 Progressive point set surfaces

Shachar Fleishman, Daniel Cohen-Or, Marc Alexa, Cláudio T. Silva

October 2003 **ACM Transactions on Graphics (TOG)**, Volume 22 Issue 4

Full text available:  pdf(184.27 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Progressive point set surfaces (PPSS) are a multilevel point-based surface representation. They combine the usability of multilevel scalar displacement maps (e.g., compression, filtering, geometric modeling) with the generality of point-based surface representations (i.e., no fixed homology group or continuity class). The multiscale nature of PPSS fosters the idea of *point-based modeling*. The basic building block for the construction of PPSS is a projection operator, which maps points in ...

**Keywords:** Moving least squares, point-based modeling, surface representation and reconstruction

20 Topology preserving and controlled topology simplifying multiresolution isosurface

extraction

Thomas Gerstner, Renato Pajarola

October 2000 **Proceedings of the conference on Visualization '00**Full text available:  [pdf\(1.37 MB\)](#)Additional Information: [full citation](#), [citations](#), [index terms](#)

**Keywords:** critical points, implicit surface approximation, level-of-detail, tetrahedral grid refinement, topological genus

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